We claim:

1. An optical return-to-zero transmitter comprising:

means for providing a pulsed optical signal;

an optical modulator arranged to receive a non-return-to-zero electrical data signal and a bias signal, to modulate said optical signal with said data signal;

whereby said optical signal providing means and said modulator provide a return-to-zero optical output signal modulated with said data signal;

means for controlling the difference in phase between said pulsed optical signal and said data signal in response to a phase control signal;

means for adding a first dither signal to said difference in phase and a second dither signal, having a different frequency than said first dither signal, to said bias signal;

means for monitoring the amplitude of variations in the power of the optical output signal corresponding to cross-modulation of said first and second dither signal frequencies; and

means responsive to said monitored amplitude for adjusting said phase control signal to maintain phase synchronization between said pulsed optical signal and said data signal.

2. The optical return-to-zero transmitter of claim 1, wherein said means for providing a pulsed optical signal comprises:

means for providing a continuous optical signal;

a second optical modulator arranged to receive a clock signal to modulate said optical signal with pulses.

3. The transmitter of claim 2, wherein said second optical modulator is connected downstream of said optical modulator arranged to receive said non-return-to-zero electrical data signal.

4. The transmitter of claim 2, wherein said optical modulators are Mach-Zehnder modulators.

5. The transmitter of claim 1, wherein the frequency of said second dither signal is substantially lower than the frequency of said first dither signal, and said means for monitoring the amplitude comprises first means for monitoring a first amplitude, being the amplitude of variations in the power of the optical output signal at the frequency of the first dither signal and second means for monitoring the amplitude of variations of said first amplitude at the frequency of the second dither signal.

6. In a return-to-zero optical transmitter in which an optical signal is modulated by a non-return-to-zero electrical data signal applied to an electro-optical modulator and pulsation at the data rate of said data signal is provided by a clock signal, to provide a return-to-zero optical output signal, a method of controlling the difference in phase between said clock signal and said data signal, said method comprising:

adding a first dither signal to said difference in phase and a second dither signal, having a different frequency than said first dither signal, to a bias signal applied to said electro-optical modulator;

monitoring the amplitude of variations in the power of the optical output signal corresponding to cross-modulation of said first and second dither signal frequencies; and

controlling said difference in phase in response to said amplitude.

7. The method of claim 6, wherein said optical modulator is a Mach-Zehnder modulator.

8. The method of claim 6, wherein the frequency of said second dither signal is substantially lower than the frequency of said first dither signal, and monitoring the amplitude comprises monitoring a first amplitude, being the amplitude of variations in the power of the optical output signal at the frequency of the first dither signal and monitoring the amplitude of variations of said first amplitude at the frequency of the second dither signal.